

the male on the forewing, and sometimes only the two apical ones; the red band in the male is always very reduced in extent, but not as much as in *valesiaca*; usually not entirely broken between the apical ocelli and the hinder one, although it is often reduced to a faint and narrow streak; broader and of more even breadth on underside; on hindwings above three red circles round the eye-spots always present, but never confluent, and in some cases very thin; light band of underside scarcely ever perceptible in the male. In the female the bands and eye-spots do not differ as strikingly from those of the nymotypical race; they are considerably less extensive than in race *eturiae*, Vrtý., *Ent. Rec.*, 1919, p. 124 (= *constantinii*, Turati), from the Apennines in Northern Tuscany, but much less so than in the first female, wrongly figured by Seitz on pl. 85 of *Gross-schmett.*, under the name of *stygne*, whereas it is a very extreme *valesiaca*. For the race of the Sibillini Mts. I suggest the name of **TETRICA**, mihi.

As I am dealing with this genus, I must take the occasion to say a few words in answer to Mr. B. C. S. Warren's question concerning *E. flavofasciata*, Heyne-Rühl., in his interesting paper in *Ent. Rec.* of May last, p. 78. The question he puts is whether the race he has collected near the Tschierwa glacier, in the Engadine, is the nymotypical one of the Campolungo Pass, in Tessin, or *thiemei*, Bartel, of Pontresina. Possessing a nice series of the former and "co-types" of the latter, sent to me by Bartel himself, I have ascertained at a glance that Warren's specimens come distinctly nearer *thiemei*. To be more accurate, however, I should notice that only two of the twelve he figures on pl. I. are really exactly similar to Bartel's, *i.e.*, the male and the female, with the broadest and most continuous underside band, at the bottom of column I. The ten others have the band much more reduced and broken than in *thiemei*, and constitute a much more extreme and distinct race than the latter, standing opposite the nymotypical *flavofasciata*, and well worth distinguishing by the name of **WARRENI**, mihi.

---

### The Growing Importance of Entomology.

By H. S. FREMLIN, M.R.C.S., L.R.C.P., F.E.S.

To most collectors Entomology means collecting butterflies and moths, getting as many species of these as possible, having good series and as many varieties as one is able to obtain. To such an one the "Bath White" and the "Camberwell Beauty" are always looked-for prizes, and the mind turns now and then with longing to a "Clifton Nonpareil," or a "Crimson Speckled Footman;" to all the "Large Copper" is a gem in the collection, even though it must be obtained at Stevens'. There are other Collectors who hunt for beetles, or dragonflies, or bees, and here and there one who works for grasshoppers. or earwigs; but these are few.

To all such collectors a new species, a rare specimen, an extraordinary variety, or some special form such as a beetle that looks like a wasp, or a butterfly that birds like the taste of, disguising itself as another sort that birds do not fancy; all of these are of great interest, and about them societies are formed, meetings are held, evenings are spent, and month by month, year by year, they are exhibited and

discussed, whilst *the* important things of Entomology, its relations with plant-life and medicine are lightly passed over.

As the idea of getting a collection fades there arises, however, in the mind, a hazy idea of the real, vast and increasing importance of Entomology in the world. In this paper I wish to bring to your notice two of the features that are most prominent; the first is: Insects and their influence in the Vegetable Kingdom; the second: the part Insects take in the Causation of Disease.

The fact that all people and many animals are dependent on vegetable life for their existence, is of course well known; yet until a few years ago very little was systematically carried out to keep insects in check, and not much was known of their life-history; when they came and the leaves and flowers disappeared from tree or plant leaving only stalks, they might be syringed with a mixture of soft soap and water, or soot, or lime be dusted over them; if these remedies failed, hand picking, when possible, was tried, but this was generally done when most of the larvae were full fed and the crop already destroyed.

Thousands of acres of crops were blighted by Aphides every few years, and part of a county frequently suffered from vast numbers of the "Winter Moth" larvae, which ate the expanding buds and young leaves of oaks, apples, nuts, pears, etc., leaving the trees without either leaves or flowers, and looking as they would in the middle of winter, and so much injured that not only was the crop destroyed for that year, but after the trees had apparently recovered they were too weak to produce a satisfactory crop in the following year. No remedy for either the Aphides or "Winter Moth" was then known. Abroad locusts frequently swept over miles of vegetation leaving the country bare. Probably even now 2% of the crops are destroyed each year by insect attacks on seeds, seedlings, roots, wood, stems, leaves, flowers and fruit, also on stored grain, flour and other food. What does this loss represent in money? Given that there are 1,500,000,000 people in the world and that each individual requires one shilling's worth of vegetable food a week which amounts to £3,750,000,000 a year; 2% of this is £75,000,000. The insects that cause this enormous loss belong to all the Orders, larvae of moths attacking forests destroy the leaves over thousands of square miles, or attacking fruit trees live in the open buds, destroying leaves and flowers, piercing holes in the young fruit. Larvae of both moths and beetles do great damage to forest trees, not only do they feed on the wood, and either destroy the trees or so interfere with their growth that they are worthless as timber, but also drill holes into felled trees and so spoil them; much wood is rendered useless by "Worm" in this way.

Locusts, another scourge, living when young in wild grassy areas, on reaching maturity and having acquired wings, fly in vast clouds from place to place, clearing all vegetation wherever they settle. Another insect, the ant, is also very injurious to general vegetation. The White Ant of the Tropics is one of the most destructive insects known, travelling in vast numbers it destroys wood, clothes, leather, in fact anything but metal or stone, that happens to be on its line of march. A curious insect known as the "Scale" attaches itself to the bark of branches, to twigs and leaves, especially to oranges and lemons, and sucks the sap: it is often present in such numbers as to cover whole limbs, greatly interfering with growth and crop. Cockroaches are well

known in houses and cause much damage and discomfort. Aphides or plant lice can blight the leaves of nearly every sort of tree or plant, and, when the seasons are favourable to them, increase in such vast numbers as to destroy the crops and almost kill their hosts. These are but few instances of the great power of destruction possessed by insects. However, for some years now a great deal of work has been done to lessen the damage thus caused. The late Miss Ormerod was one of the first to draw public attention to the great harm done to crops by insects, and her book on *Injurious Insects* and the suggestions there made for their control were sorely needed and have proved extremely useful.

At the present time there are workers on Economic Entomology in many parts of the world, and they are doing a great work, not only in studying the life-history of injurious insects and finding new species, but also in preparing and testing remedies, and most important of all, growing the parasites that attack injurious insects, and where possible obtaining these in sufficient numbers to send to other countries where the same crops grow but where the parasites do not exist naturally. The most effective remedies for insect pests, are other insects and fungi which act as parasites.

Turning now to the association between Entomology and Disease, practically nothing was known before 1898. The Tse-Tse fly was known to destroy horses and cattle in Africa, and cattle and sheep were worried and at times died of attacks by larvae of carnivorous flies. When Ross discovered the parasite of Malaria in a mosquito and showed how this parasite was carried to man, the Medical world realised that a new light was shed on the cause of disease, and that our knowledge of infection had now brought another science in touch with Medicine, and Entomology was permanently linked to it and to be considered in all questions of the cause and prevention of disease.

Since then many insects have been shown to set up disease either (1) by simply carrying an infective agent on their feet, as the house fly carries the germs of Typhoid fever, Dysentery, Cholera, etc., or (2) as a biting insect that carries the agent of disease on its proboscis and thrusts this into the blood stream of the host, as the flea carries the plague bacillus from an infected rat; or (3) by the insect itself becoming the host for the partial development of a parasite which escapes from it in the saliva and is so transmitted to man; in this way a mosquito carries the Malaria parasite.

Knowledge of insect infections has so extended that Entomology is now one of the most important branches of Tropical Medicine. When M. de Lesseps attempted to dig the Panama Canal, he failed on account of the enormous death roll of all who ventured to undertake the work. The cause of the disease was then unknown; but when the connection between Entomology and Medicine was better understood it was found that a mosquito was the cause. This mosquito was banished by clearing out its breeding grounds on both sides of the track, and the death roll became practically nil. West Africa, up to only a few years since, was known as "The White Man's Grave"; now it is simply a hot country where with care one can remain healthy. Again, all have read of the Plague, a disease that has killed tens of thousands and almost destroyed nations, it is now known to be carried by a flea. The above are only a few illustrations of the known connection between insects and disease.

So that, as you see, insects carry destruction into the vegetable world, and disease and death into the animal kingdom; this great multitude of butterflies, moths, wasps, flies, grasshoppers, beetles, aphides, mosquitos, midges, fleas, thrips, lice, and so on, coming into existence every day and rising as a cloud over the earth, these are to be controlled, the friends improved and multiplied, and the enemies hunted out and destroyed. Specialists are doing their best, and a large amount of good work is being done. National thanks are due to the Entomological Societies who, entirely unsupported from without, are at present the chief trainers of Collectors, not only bringing them among colleagues, but giving them at any time the best advice.

With all this however there is a lack of central organisation; nothing corresponding to The College of Physicians exists; no examinations are held in which Entomology is a subject, so far as I know, and no degree given by Universities. It has to be taken up as a hobby, or learned by those who are necessarily brought in contact with insect pests, as gardeners, or as agriculturalists. For a subject of such universal importance to all living things, when every man should know what harm a fly or a mosquito may do, and anyone who grows vegetables or keeps fowls should know how to kill caterpillars and lice, surely a central organisation is necessary; a College of Entomology, where men are trained in all branches of this subject, where insects and their parasites are investigated, where insect blights of individual species of plants growing in various parts of the world could have the pests and their parasites studied, where arrangements could be made to distribute useful parasites. This central body should be linked up with Stations in all parts of the world to give advice, examine specimens and receive reports. Investigations carried out in the Tropics on pests or disease-producing insects should be notified, and when necessary experts could be sent out to assist the investigator. Inspectors should also form part of the Central Staff to assist in training the public by lectures, advice and practical help. A definite system of training should be required of all who were Members of this College. They should have a general knowledge of all orders of insects and make a speciality of one. They should also have a good knowledge of Botany, which is essential in connection with vegetable blights, and of Chemistry, so necessary in dealing with Insecticides both in their preparation, use, and, where necessary, analysis.

This is only a slight outline of the great and growing importance of Entomology, and I trust that this paper may lead others better qualified to bring the subject before the notice of the public, that they may develop some definite scheme worthy of such a universally important Science.

---

### Psychides.

The Rev. C. R. N. Burrows, F.E.S., The Vicarage, Mucking, Stanford-le-hope, Essex, is very desirous of obtaining specimens of the following species of *Psychides* of which he has hitherto been unable to obtain even a single example.

*N. astrella*, *D. adspersella*, *P. melas*, *P. punctata*, *P. melana*, *S. suifunella*, *S. fumosella*, *S. pallida*, *B. douglasii*, *B. conspurcatella*, *B. montanella*, *B. defoliella*, *T. borealis*, *T. improvisella*, *S. technica*, *S.*